Corporate Environmental Technology
Environmental Testing Laboratory

Ciba-Geigy Corporation
P.O. Box 71, Route 37 West
Toms River, NJ 08754

Telephone 908 914-2545
Fax 908 914-2916

February 16, 1994

Frank Battaglia
United States Environmental Protection Agency
JFK Federal Building
Boston, MA 02203

Dear Sir:

This letter, with attachment, is provided at the suggestion of Deborah Szarro as confirmation to recent conversations regarding the analytical work at Ciba-Geigy's Cranston, Rhode Island site. The facility is undergoing a RCRA investigation, and sampling activities are scheduled to commence within one or two weeks for a duration of about eight weeks. There have been several large sampling efforts at the facility, the first in 3Q91. Because the characteristics and extent of contamination have been fairly well established, the Ciba-Geigy Corporation is requesting approval to perform some of the modeling and routine monitoring analytical tasks using internal resources. To that end, I have attached copies of an amended Appendix H (Ciba Environmental Testing Laboratory QA Plan) to the site Quality Assurance Project Plan for your evaluation. Ms. Szarro asked that you forward a copy of the document to the Environmental Services Division for review.

The Environmental Testing Laboratory (ETL) has performed metals and other inorganic analysis tasks for the site since the first sampling campaign in 1991. Environmental Protection Agency approval is requested for the analysis of selected volatile and semivolatile analytes on the Pawtuxet River Modeling Event, scheduled for sampling in March or April.

Thank you for your attention to this matter. If you have any questions, please call me.

Respectfully,

John Rissel, Manager
Analytical Technology

dm
Enclosure

c: D. Baldi
D. Leber
D. Mitchell
J. Smith
B. Steelman (w/o enclosure)
D. Szarro

Quality Assurance Project Plan

for

RCRA Facility Investigation of CIBA-GEIGY Facility in Cranston, RI

submitted by

CIBA-GEIGY CORPORATION
CORPORATE ENVIRONMENTAL TECHNOLOGY
ENVIRONMENTAL TESTING LABORATORY
Route 37 West
Toms River, NJ 08754

Approval:

D. Mitchell — 2/16/94

Denis Mitchell
Laboratory Manager — Date

Frank Saksa — 16 Feb 94

Frank Saksa
Quality Assurance Officer — Date

for — 16 FEB 94

Diana Baldi
National Service Contract Administrator — Date

2.0 TABLE OF CONTENTS

2.1 Distribution:

Mark Houlday
Woodward-Clyde Consultants
201 Willowbrook Boulevard
Post Office Box 290
Wayne, NJ 07470
Voice: (201) 785-0700
FAX: (201) 785-0023

CIBA-GEIGY Corporation
PO Box 71
Route 37 West
Toms River, NJ 08754

Denis Mitchell
Laboratory Manager
Voice: (908) 914-2519
FAX: (908) 914-2916

Julie Smith
Project Coordinator
Voice: (908) 914-2845
FAX: (908) 914-2905

Dan Britton
Wet Chemistry Laboratory Supervisor
Voice: (908) 914-2936
FAX: (908) 914-2916

Dorren McNichols
Metals Laboratory Supervisor
Voice: (908) 914-2928
FAX: (908) 914-2916

Frank Saksa
Quality Assurance Officer
Voice: (908) 914-2789
FAX: (908) 914-2916

Dave Ellis
Organics Laboratory Supervisor
Voice: (908) 914-2710
FAX: (908) 914-2916

Diana Baldi
NSCA
CIBA-GEIGY Corporation
410 Swing Road
Greensboro, NC 27409
Voice: (910) 632-7506
FAX: (910) 632-2048

3.0 PROJECT DESCRIPTION

An administrative order of Consent (No. I-88-1088) to Ciba-Geigy Corporation, Ardsley, New York, was issued by Region I United States Environmental Protection Agency. This order requires that a RCRA Facility Investigation be conducted at the Ciba-Geigy facility in Cranston, Rhode Island, in order to evaluate thoroughly the nature and extent of any release of hazardous waste or hazardous constituents at or from the facility and to gather data necessary to support and develop the corrective measures study.

The Ciba-Geigy Environmental Testing Laboratory (ETL) will perform analyses of field samples for this Ciba-Geigy RCRA facility investigation.

All data collected during this RCRA Facility Investigation and the decisions based upon these data must be technically sound, statistically valid, and properly documented. This laboratory Quality Assurance Project Plan (QAPJP) describes the procedures that will be used to document sample analyses during the RCRA Facility Investigation (RFI) at the Ciba-Geigy facility. This plan includes the organization of investigative methodologies for volatile and semivolatile organics and water quality parameters, and the associated QA/QC procedures that will be utilized to ensure that all data collected during, and reported by, this study are representative of existing site conditions.

See the main document "Quality Assurance Documents: Supplement #1 (January 1992)" for the project description.

Environmental Testing Laboratory

The Environmental Testing Laboratory (ETL) is part of the Analytical Technology Group in the Corporate Environmental Technology Center (ETC). ETL is a high throughput, certified compliance laboratory capable of routine to moderately sophisticated analytical support. This laboratory utilizes standard procedures accepted by regulatory agencies and is accredited in multiple states. The lab is capable of implementing and producing EPA Contract Laboratory Program (CLP) deliverables. ETL intends to perform the Water Quality and selected volatile and semivolatile organics analyses on the river modeling event for Phase II of the RCRA Facility Investigation at the Cranston, Rhode Island site. The laboratory is located in Toms River, New Jersey. This project would specifically involve the metals laboratory, the organics laboratory, and the wet chemistry laboratory.

The laboratory is certified in New Jersey, North Carolina, South Carolina, Pennsylvania, Delaware, Connecticut, Alabama, Massachusetts and Iowa. Selection of states or agencies for certification has been based on the needs of the corporation to date.

ETL holds certification in the areas of organics, metals, classical chemistry, and bioassay and is capable of providing full service compliance monitoring.

4.0 PROJECT ORGANIZATION

Environmental Testing Laboratory (ETL) will provide the chemical analyses for the RCRA Facility Investigation.

The organizational structure of these laboratory facilities are outlined in Figures 4.1, 4.2, and 4.3. Figure 4.1 shows the organization of Corporate Environmental Technology. Figure 4.2 illustrates the three sections within the Analytical Technology Group and the communication channels for the Cranston project. Figure 4.3 shows the organization of Corporate Environmental Testing Laboratory for the Cranston project. ETL's key personnel for Cranston project contacts are included in Figure 4.4. Resumes are included in Section 17.0 of this QAPjP.

Duties of the key personnel are as follows:

A) ETL Manager:
   1) Preparing all work plans, schedules and manpower allocations;
   2) Initiation of all procurement of internal resources for the projects;
   3) Day-to-day supervision of the project team including analytical department managers, and data management personnel;
   4) Exercise final review and approval on all reports and invoices for the project;

B) Program Coordinator:
   1) Initial contact with Ciba-Geigy NSCA on individual job tasks:
   2) Coordinating financial and contractual aspects of the projects;
   3) Formatting and technical review of all reports;
   4) Providing day-to-day communication with Ciba-Geigy;
   5) Respond to post project inquiries.
   6) Exercise initial review and approval on all reports and invoices for the project;

C) QA Officer:
   1) Coordinate with the Program Coordinator, Laboratory Manager, and all other project personnel in order to ensure that project QA is maintained;
   2) Review all QA activities;
   3) Review case narratives on each report;
   4) Perform periodic system audits; and
   5) Review nonconformance reports and approve corrective actions.
   6) Exercise secondary review and approval on all reports and invoices for the project;

Immediately prior to sampling and during the sampling event, communication will be via three-way calls among Woodward-Clyde, ETL and the NSCA.

ORGANIZATIONAL CHART

CORPORATE ENVIRONMENTAL TECHNOLOGY

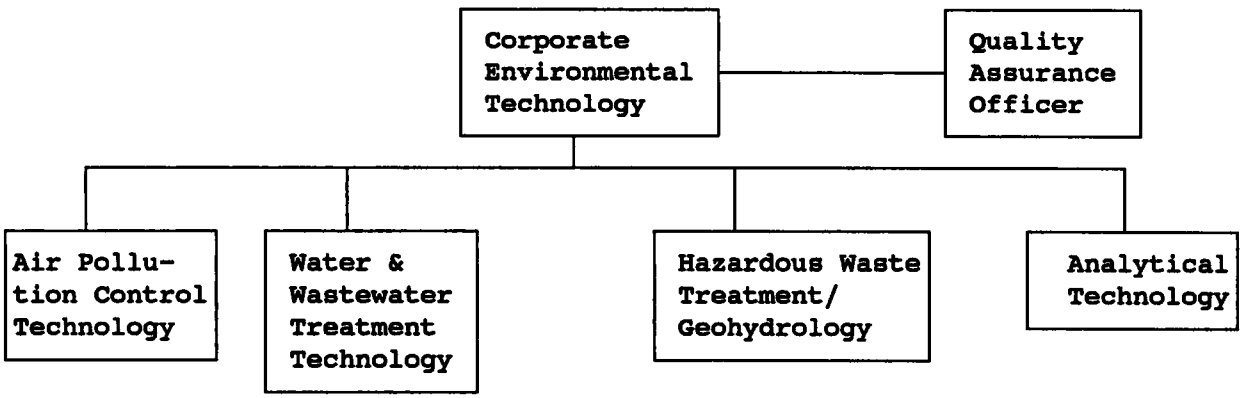


Figure 4.1

ORGANIZATIONAL CHART

ANALYTICAL TECHNOLOGY/
WOODWARD-CLYDE CONSULTANTS

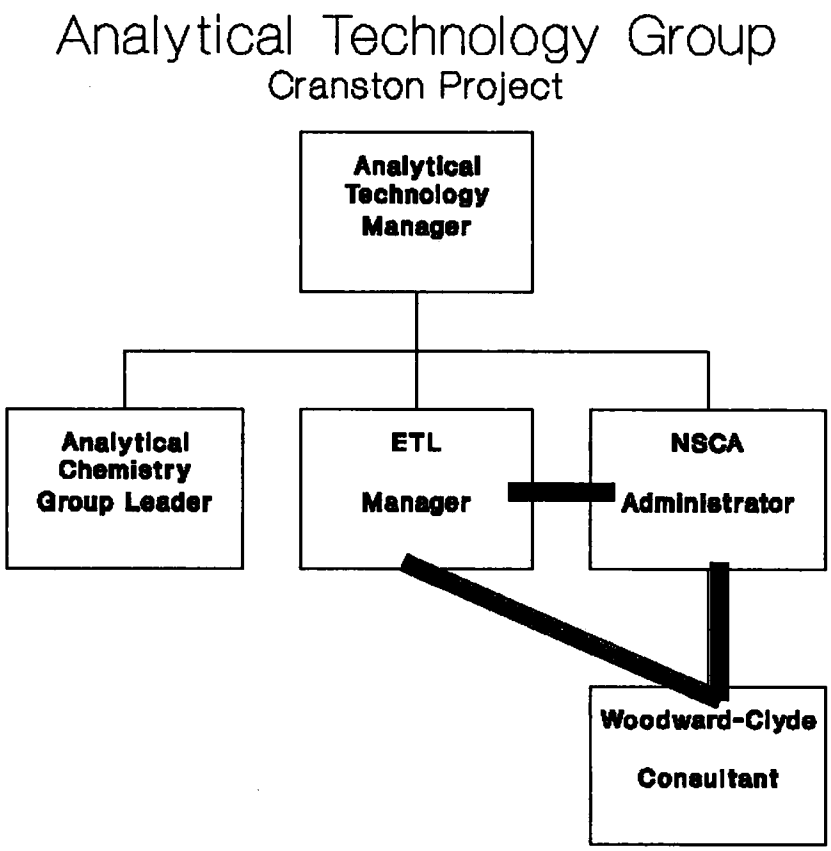


Figure 4.2

ORGANIZATION CHART

ENVIRONMENTAL TESTING LABORATORY

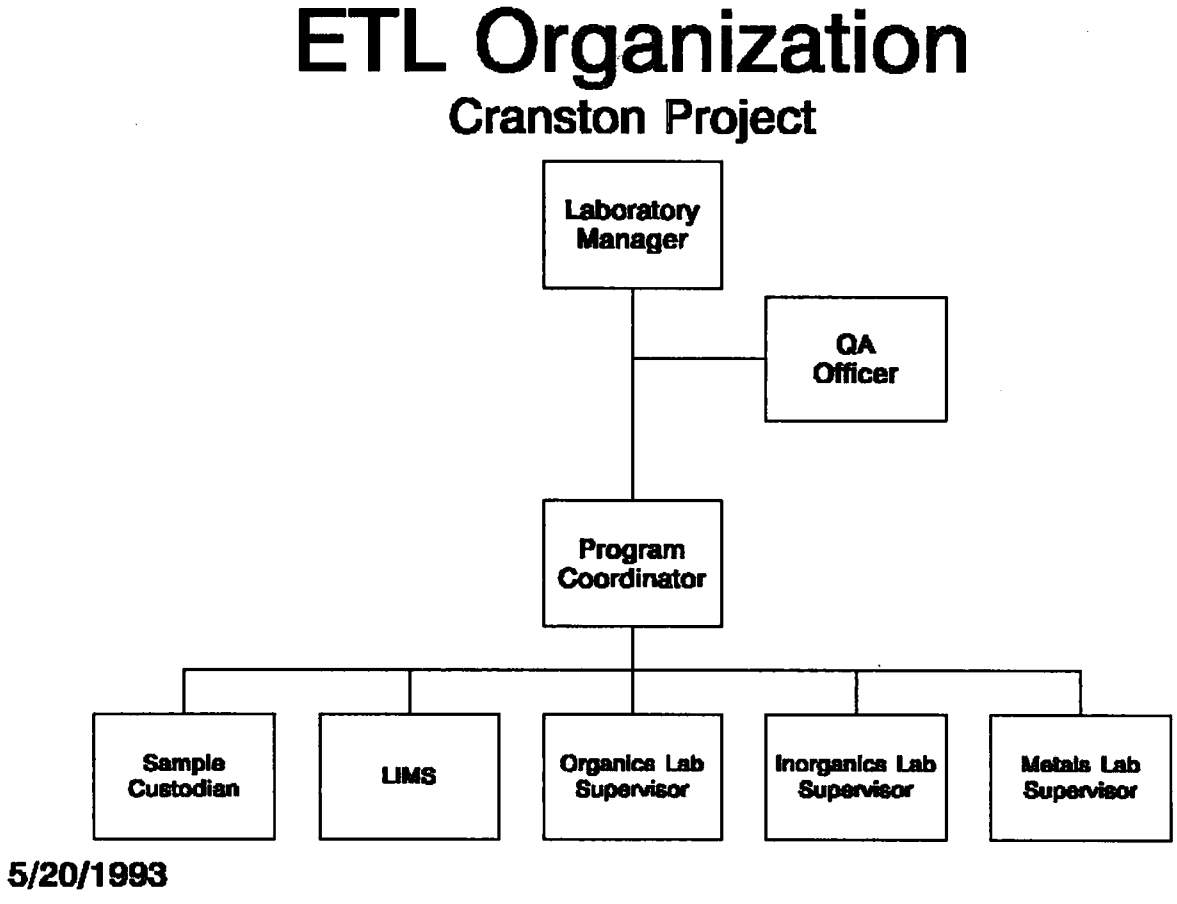


Figure 4.3

PROJECT CONTACTS	
Environmental Testing Laboratory Route 37 West Toms River, NJ 08754 Phone (908) 914-2545 Fax (908) 914-2916	
Name	**Title**
Julie Smith	Program Coordinator
Frank Saksa	QA Officer
Denis Mitchell	Laboratory Manager
John Rissel	Manager, Analytical Technology

Figure 4.4

Contractual Contact:	Laboratory Manager	Ext. 2519
Technical Contact:	Program Coordinator	Ext. 2845
Sampling Contact:	Sample Custodian	Ext. 2775

All personnel may be reached at the following:

Ciba-Geigy Corporation
PO Box 71
Route 37 West
Toms River,
New Jersey
08754

908-914-2545 (voice)
908-914-2916 (facsimile)

5.0 QUALITY ASSURANCE OBJECTIVES

Precision

Precision is the degree to which the measurement is reproducible. Precision can be assessed by measurements of duplicate preparations of sample or MS/MSD. Precision is determined by comparison of these duplicate results. The standard deviation of n measurements of x is commonly used to estimate precision, where x is the difference between the two values.

In the case of duplicates, the relative percent difference (RPD) between the two samples may be used to estimate precision.

$$RPD = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} \times 100$$

where: RPD = relative percent difference

D_1 = first sample value

D_2 = second sample value (duplicate)

Accuracy

Accuracy is a determination of how close the measurement is to the true value. Accuracy can be assessed using standard reference materials or spiked environmental samples. The determination of the accuracy of a measurement requires a knowledge of the true or calculated value for the control sample or of the amount of analyte being added to the sample. Accuracy may be calculated in terms of percent recovery as follows:

$$\text{Percent Recovery} = \frac{X}{T} \times 100$$

where: X = the observed value of measurement (corrected for sample amount, if necessary

T = "true" value

Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Analytical data should represent the sample analyzed regardless of the heterogeneity of the original sample matrix. ETL strives to accommodate all sample matrices. Some samples may require analysis of multiple phases to obtain representative results. For the Cranston project, ETL is responsible for obtaining a representative sample from the sample container. It is the responsibility of those performing the sampling to assure that the sample collected is representative of field conditions.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions. To be considered complete, the data set must conform to all quality control criteria which verify precision and accuracy for the analytical protocol. For the Cranston project, efforts will be made to meet 95% or better completeness. Immediate corrective action will be taken when it is known that resampling will be required or if repreparation or reanalysis of a sample will be required. Attempts will be made to perform the reanalysis within holding time so that the data may be considered complete.

Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured through the use of established and approved analytical methods, consistency in the basis of analysis (wet weight, volume, etc.), consistency in reporting units (ppm, ppb, etc.) and analysis of standard reference materials. Those analytical methods employed for the Cranston project are shown below.

METAL AND INORGANIC PARAMETERS

For the metal and inorganic parameters, each batch of 20 samples or each analytical sequence has a matrix spike and a matrix spike duplicate prepared and analyzed for each matrix type in the analytical batch. The spiking components are the analytes under test; the spiking concentrations and the acceptance limits are listed in Table 5.1.

Acceptable Ranges for Spiked Samples (Inorganics)

Parameter	Spike Level (mg/l)	Recovery Range (%)	Maximum RPD (%)
BOD_5	200	82-119	12
TSS	10	93-122	10
TDS	586	82-108	5
COD	25	68-120	8
TOC	10	83-115	8
TOC (Low level)	1	68-125	8
TKN	5	60-135	20
NH_3	5	75-125	12
PO_4	0.5	70-130	9
NO_3/NO_2	0.5	80-120	5
Ca	10	77-125	4
Mg	10	87-113	4
Na	10	75-122	5
K	2	78-117	2
Fe	1	77-125	6
Mn	0.2	82-121	8
Cl	1	91-106	4
SO_4	1	92-105	2
Alk	100	99-103	2
TPHC	10	30-134	15
O&G	5	20-135	13

Table 5.1

METHOD 8260

For SW-846 Method 8260, Volatile Organics by GC/MS, each batch of 20 samples or each analytical sequence has a matrix spike and a matrix spike duplicate prepared and analyzed for each matrix type in the sequence. The spiking components, concentrations, and the acceptance limits are in accordance with the method, and are listed below. The spiking compounds are benzene, chlorobenzene, 1,1-dichloroethylene, toluene, and trichloroethylene at a 0.25 µg spike level in five milliliters sample (50 ppb). The percent recovery and the relative percent difference (RPD) must conform to those criteria listed in Table 5.2.

EPA Method 8260 QC Limits

Compound	%RPD		% Recovery	
	water	soil	water	soil
1,1-Dichloroethene	14	22	61-145	59-172
Trichloroethylene	14	24	71-120	62-137
Chlorobenzene	13	21	75-130	60-133
Toluene	13	21	76-125	59-139
Benzene	11	21	76-127	66-142

Table 5.2

METHOD 8270

For SW-846 Method 8270, Semivolatile Organics by GC/MS, each batch of 20 samples or each analytical sequence has a matrix spike and a matrix spike duplicate prepared and analyzed for each matrix type in the sequence. The spiking components, concentrations, and the acceptance limits are in accordance with the method, and are listed below. The spiking compounds are 1,4-dichlorobenzene, N-nitroso-di-n-propylamine, 1,2,4-trichlorobenzene, acenaphthene, 2,4-dinitrotoluene, and pyrene all at 100 ug/L and phenol, 2-chlorophenol, 4-chloro-3-methylphenol, 4-nitrophenol, and pentachlorophenol at 200 ug/L. The percent recovery and the relative percent difference (RPD) must conform to those criteria listed in Table 5.3.

EPA Method 8270 QC Limits

	%RPD		% Recovery	
Compound	water	soil	water	soil
1,4-Dichlorobenzene	28	28	36-197	28-104
N-nitroso-di-n-propylamine	38	38	41-116	41-126
1,2,4-Trichlorobenzene	28	23	39- 98	38-107
Acenaphthene	31	19	46-118	31-137
2,4-Dinitrotoluene	31	47	24- 96	28- 89
Pyrene	31	36	26-126	35-142
Phenol	42	35	12- 89	26- 90
2-Chlorophenol	40	50	27-123	25-102
4-Chloro-3-methylphenol	42	33	23- 97	26-103
4-Nitrophenol	50	50	10- 80	11-114
Pentachlorophenol	50	47	9-103	17-109

Table 5.3

6.0 SAMPLING PROCEDURES

Sampling procedures for this project are specified in the Woodward-Clyde Consultant (WCC) Quality Assurance Document.

Sample Collection

Samples will be collected by Woodward-Clyde Consultants (WCC) field personnel. Adequate quantities of laboratory pure water will be provided with the sample container sets to be used for field blanks.

Holding Times

EPA has established holding time requirements for most analyses. These holding time requirements are listed in Table 6.1, along with containers and preservative requirements. On occasion, a sample must be reanalyzed to comply with this QA Project Plan. Typically, if this reanalysis is conducted outside of the holding time, the laboratory will be considered to have fulfilled its obligation to meet holding times if the first preparation and/or analysis was initiated within the prescribed holding time. For this project, every effort will be made to achieve 100% completeness from the standpoint of performing even reanalyses within hold times.

Sample scheduling and delivery will be handled initially between the NSCA and the laboratory manager. Immediately prior to and during sampling, communications will be shifted to the WCC sampling coordinator and the ETL Sample Custodian for expected sample shipments or to communicate problems with samples received (eg. broken bottles, illegible chains-of-custody, etc). Three way communications between WCC, the NSCA and ETL are held when appropriate.

ETL's sampling responsibilities will be limited to providing containers as specified in Table 6.1 of this document which lists the containers used for sampling, preservatives, holding times, and conditions for water and soil/sediment samples.

CONTAINER PRESERVATION TECHNIQUES, CORRESPONDING PRESERVATIVE AND MAXIMUM ANALYSIS HOLDING TIMES FOR WATER SAMPLES

PARAMETER	CONTAINER REQUIRED[1]	PRESERVATION[2]	MAXIMUM ANALYSIS HOLDING TIME FROM COLLECTION DATE
Inorganics:			
Cyanide (9012)	1-100 mL polyethylene	Cool 4°C NaOH to pH)12	14 days
Metals (6010/7060/ 7740/7421/7841)	1-500 mL polyethylene	HNO_3 to pH <2	6 months
Mercury (7470)	1-500 mL polyethylene	HNO_3 to pH <2	28 days
Sulfide (9030)	1-500 mL polyethylene	Cool to 4°C, add zinc acetate + NaOH to pH >9	7 days
Organics:			
Purgeables (8260)	4-40 mL glass vials with TFE-lined septa	Cool 4°C, 4 drops conc. HCl per vial	14 days
Base-Neutral/Acid Extractables (8270)	2-1 L amber glass with TFE-lined cap	Cool 4°C	Extraction-7days Analysis-40 days
Chlorinated Pesticides (8080)	2-1 L amber glass with TFE-lined cap	Cool 4°C	Extraction-7 days Analysis-40 days
Organophosphorus Pesticides (8141)	1-1 L amber glass with TFE-lined cap	Cool 4°C	Extraction-7 days Analysis-40 days
Chlorinated Herbicides (8150)	1-1 L amber glass with TFE-lined cap	Cool 4°C	Extraction-7 days Analysis-40 days
Wet Chemistry Parameters:			
Biochemical Oxygen Demand (BOD)	1-1 L polyethylene	Cool 4°C	48 hours
Chemical Oxygen Demand (COD)	1-100 L polyethylene	Cool 4°C, H_2SO_4 to pH <2	28 days
Total Suspended Solids (TSS)	1-100 L polyethylene	Cool 4°C	7 days
Total Dissolved Solids (TDS)	1-1 L polyethylene	Cool 4°C	7 days
Total Petroleum Hydrocarbons (TPHC)	1-1 Liter amber glass	Cool 4°C, HCL to pH <2	28 days
Oil and Grease	1-500 mL glass	Cool 4°C, H_2SO_4 to pH <2	28 days

TABLE 6.1

CONTAINER PRESERVATION TECHNIQUES, CORRESPONDING PRESERVATIVE AND MAXIMUM ANALYSIS HOLDING TIMES FOR WATER SAMPLES

PARAMETER	CONTAINER REQUIRED[1]	PRESERVATION[2]	MAXIMUM ANALYSIS HOLDING TIME FROM COLLECTION DATE
Total Organic Carbon (TOC)	1-125 mL amber glass	Cool 4°C, H_2SO_4 to pH<2	28 days
Total Kjeldahl Nitrogen (TKN)	1-100 mL polyethylene	Cool 4°C, H_2SO_4	28 days
Chloride (Cl)	1-100 mL polyethylene	Cool 4°C	28 days
Sulfate (SO_4)	1-50 mL polyethylene	Cool 4°C	28 days
Ammonia (NH_4)	1-100 mL polyethylene	Cool 4°C, H_2SO_4 to pH <2	28 days
Nitrate/Nitrite (NO_3/NO_2)	1-100 mL polyethylene	Cool 4°C, H_2SO_4 to pH <2	28 days
Phosphate (PO_4)	1-50 mL polyethylene	Cool 4°C	48 hours
Langlier Index Ca Mg TDS Alk-T pH Specific Cond. Temperature	 1-250 mL polyethlene 1-250 mL polyethlene 1 1-L polyethylene 1-250 mL polyethylene 1-50 mL polyethylene 1-50 mL polyethylene	 HNO_3 to pH <2 HNO_3 to pH <2 Cool 4°C Cool 4°C None required Cool 4°C (Field parameter)	 6 months 6 months 7 days 14 days Analyze immediately 28 days
Hardness	1-250 mL polyethylene	HNO_3 to pH <2	6 months
Alkalinity	1-250 mL polyethylene	Cool 4°C	14 days

TABLE 6.1
(Continued)

1. The sample quantities outlined are required for single sample analysis. Replicate samples will require double the sample volumes listed and matrix spike/matrix spike duplicate samples will require triplicate collection of sample volumes.

2. Field trip blank container requirements and preservatives will be the same as for aqueous samples. When any sample is to be shipped by common carrier or sent through the United States mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR, Part 172). The person offering such material for transportation is responsible for ensuring such compliance.

7.0 SAMPLE CUSTODY

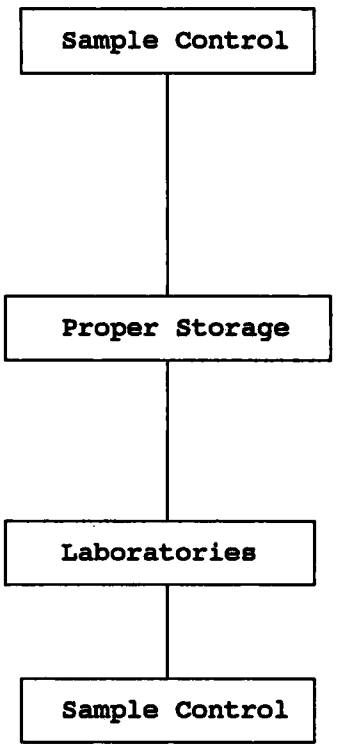
Upon receipt, samples proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation.

All samples are received by ETL sample control group and are carefully checked for label identification and match to accompanying chain-of-custody records. Additionally, sample temperature and pH information are obtained and recorded, as are any unusual sample conditions such as breakage. Each sample is then assigned a unique laboratory identification number through a computerized Laboratory Information Management System (LIMS) that stores all identifications and essential information. The LIMS system tracks the sample from storage through the laboratory system until the analytical process is completed and the sample is disposed of. Internal chain-of-custody is maintained. This process is summarized in Figure 7.1. Access to ETL, LIMS and to the sample storage areas is restricted to preclude unauthorized contact with samples, extracts or documentation.

The samples are stored in one of two limited access walk-in refrigerator maintained at one to four degrees centigrade. Each refrigerator is equipped with high and low temperature alarms. At an appropriate time, samples are lab-packed and disposed of as hazardous waste through the corporate waste handling program.

An example of the ETL Chain-of-Custody Record used to transmit samples from the client to the laboratory is given in Figure 7.2. Sample bottles provided to the client by ETL are precleaned and batch analyzed and are transmitted under custody. Overall responsibility of the sample custody function is held by the Program Coordinator. Please see Section 17 for personnel.

SAMPLE PROCESSING FLOW CHART



* Check and document physical condition of sample
* Verify documentation and analysis assignment
* Log into LIMS
* Send acknowledgement letter to client (where applicable)

* Store sample according to preservation guidelines
* Transfer sample to lab with proper documentation

* Document analytical work
* Return used samples to Sample Control

* Return sample to client or arrange for sample disposal

Figure 7.1

CHAIN-OF-CUSTODY

NJ CERTIFIED LAB # 15265
NC CERTIFIED LAB # 297
AL CERTIFIED LAB # 40590
CT CERTIFIED LAB # PH 0795
IA CERTIFIED # 101

SC CERTIFIED LAB # 94011
PA CERTIFIED LAB # 68-452
MA CERTIFIED LAB # NJ254
DE CERTIFIED LAB

CORPORATE ENVIRONMENTAL TESTING LABORATORY

CHAIN OF CUSTODY
ROUTE 37 W TOMS RIVER, NJ 08754
(908) 914-2500 or (800) 962-6933
FAX (908) 914-2916

ciba

PAGE _____ OF _____

SHADED AREA FOR ETL USE ONLY			INFORMATION PROVIDED BY CLIENT			CONTAINER TYPE, SIZE, QUANTITY AND PRESERVATIVE							
PROJECT CODE:	PROJECT REQUEST:		SAMPLING INFORMATION SAMPLED BY: SIGNATURE:										
CHARGE NUMBER:	JOB NUMBER:		TITLE: COMPANY:										
T-A-T:			PHONE NUMBER: ( ) - EXT:										
LAB NUMBER	DATE	TIME	MATRIX	SAMPLE DESCRIPTION	TEST/COMMENTS								

CUSTODY SEAL INTACT?	Y N N/A	RELINQUISHED BY:(Signature)	DATE	TIME	RECEIVED FOR LABORATORY BY:(Signature)	DATE:	TIME:
SAMPLES PRESERVED?	Y N N/A						
HEADSPACE IN VOA'S?	Y N N/A	RECEIVED BY:(Signature)			REMARKS:		
VOA TEFLON SIDE DOWN?	Y N N/A						
COOLER TEMPERATURE:	°C	RELINQUISHED BY:(Signature)					
COMMENTS:							
		RECEIVED BY:(Signature)					

Figure 7.2

8.0 CALIBRATION PROCEDURES AND FREQUENCY

8.1 Laboratory Equipment

ETL is equipped with approved state-of-the-art instrumentation to provide quality analytical data to clients. A list of the instrumentation maintained by ETL is found in Table 8.1.

8.2 Standard Receipt and Traceability

Standards are purchased from commercial sources in mixes designed for the specific methods or as neat compounds. Dates are placed on all standards upon arrival and records showing when the standards are opened and used are also documented in the laboratory standard tracking notebooks.

8.3 Standard Sources and Preparation

ETL maintains an inventory of materials to produce stock standards or purchases stock standards from commercial vendors. Preparation of all lab-prepared stocks, intermediates, and working standards is documented in standard preparation logbooks by the responsible analysts.

8.4 Instrument Calibration

All instruments are calibrated according to the method calibration requirements of the SW-846 methods with the procedures listed in Section 9 of the QAPjP. Table 8.2 provides a summary of the calibration procedures, frequency, and standard used for each laboratory instrument.

Equipment such as refrigerators, ovens, and incubators are not calibrated per se, but are periodically checked with calibrated thermometers. Refrigerators, incubators, and ovens are checked daily and the temperatures documented in a notebook. Sample storage refrigerators are maintained at 4 ± 2° C.

Electronic analytical balances are calibrated annually. Calibration checks are performed and documented on all balances at least monthly with Class S weights.

Other miscellaneous support equipment such as autoclaves and block digestors are checked at a minimum, annually.

All thermometers are calibrated annually against an NBS-certified thermometer.

The calibration procedures are determined by the method used, the instrument manufacturers recommendations and the specific requirements of the project. Table 8.1 lists the parameters tested, the EPA Method used and the instruments used at ETL.

Methods and Types of Instruments

Parameter	EPA Method	Instrument	Manufacturer	Model
BOD_5	405.1	DO Meter	YSI	58
TSS	160.2	Balance	Mettler	AE 240
TDS	160.1	Balance	Mettler	AE 240
COD	410.4	Spectrophotometer	B&L	Spec 20
TOC	415.1	TOC Analyzer	Shimadzu	TOC500
TKN	351.3	ISE	Orion	EA-940
NH_3	350.3	ISE	Orion	EA-940
PO_4	365.2	Spectrophotometer	Hach	DR/2000
NO_3/NO_2	353.1	AutoAnalyzer	Technicon	ModelII
Ca	200.7	ICAP	Fisons ARL	3580B
Mg	200.7	ICAP	Fisons ARL	3580B
Na	200.7	ICAP	Fisons ARL	3580B
K	258.1	Flame AA	P-E	3100
Fe	200.7	ICAP	Fisons ARL	3580B
Mn	200.7	ICAP	Fisons ARL	3580B
Cl	300.0	Ion Chromatograph	Dionex	4000i
SO_4	300.0	Ion Chromatograph	Dionex	4000i
Alk	310.1	Auto-Titrator	Mettler	DL40GP
TPHC	418.1	Spectrophotometer	P-E	1420
O&G	413.2	Spectrophotometer	P-E	1420
Volatiles	8260	PT/GC/MSD	HP	5995
Semivols	8270	GC/MSD	HP	5971

Table 8.1

All instruments are calibrated initially using a blank and a minimum of three, typically five standards, except alkalinity titrations, BOD, and the gravimetric tests. This multi-point calibration is repeated as required by the method listed in Table 8.1 and Section 5 or whenever a new standard source is used (whichever is more frequent). The calibration is confirmed by analyzing a standard reference material purchased from a different source (EPA, ERA, etc.). For metals analyses, the instrument is calibrated daily. For the remaining analyses,

calibrations are confirmed daily by running one mid-range standard, which must meet acceptance criteria. If the mid-range standard is not within 10% of its absorbance value from the original calibration, the full calibration is repeated. Table 8.2 lists the frequency of calibration, the number and range of concentrations of standards used.

Frequency and Concentrations of Calibrations

			CONCENTRATION OF STANDARDS	
Parameter	Standards	Frequency	Initial Calibration Range (mg/L)	Calibration Verification Standard (mg/L)
BOD_5	1	Quarterly	20-400	200
TSS	5	Quarterly	5-53	10
TDS	5	Quarterly	60-587	293
COD	5	Quarterly	10-125	50
TOC	5	Quarterly	20-150	100
TOC (Low level)	5	Quarterly	1-10	5
TKN	5	Quarterly	2-100	20
NH_3	5	Quarterly	0.05-10	5
o-PO_4	5	Quarterly	0.05-5.0	1.5
NO_3/NO_2	5	Quarterly	0.058-0.30	0.2
Ca,Mg,Na	5	Daily	10-50	NA
K,Fe	5	Daily	2-10	NA
Mn	5	Daily	0.4-2.0	NA
Cl	5	Daily	0.5-4.0	NA
SO_4	5	Daily	0.5-7.0	NA
Alk	1	Daily	100	100
TPHC,O&G	5	Quarterly	0.8-8.0	5
8260	1(5)	12 Hours(Monthly)	0.02-0.20	0.050
8270	1(5)	12 Hours(Monthly)	0.02-0.16	0.050

Table 8.2

9.0 ANALYTICAL PROCEDURES

Laboratory analysis of all samples is conducted by EPA-approved methodology, unless such methodology does not exist. A list of all methods used with complete reference data is found at the end of Section 5.

In cases where a GC or GC/MS method is used for analysis of compounds not included in the actual method analyte list, these compounds are noted in the tables.

A detailed SOP has been prepared for each analytical method. All variations from EPA methodology are documented in the SOPs. Copies of SOPs are kept at the respective analytical benches, or by each department/section supervisor, the QA manager and the laboratory director.

9.1 GC/MS Volatiles

Volatile analysis of all samples will be conducted by method 8260 found in EPA SW-846. A list of parameters, methods and reporting limits for water and soil are included in Table 9.5.

BFB Tune
A 50 ng injection or purge of 4-bromofluorobenzene (p-BFB) will be evaluated every 12-hour shift as per EPA Method 8260. This p-BFB solution must meet the criteria listed in the Method from SW-846 (Table 9.1).

p-BFB KEY ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	base peak, 100% relative abundance
96	5 to 9% of mass 95
173	less than 2% of mass 174
174	greater than 50% of mass 95
175	5 to 9% of mass 174
176	greater than 95% but less than 101% of mass 174
177	5 to 9% of mass 176

Table 9.1

Calibration
A five-point initial calibration will be analyzed for all compounds. The RFs for the CCCs, must be ≤ 30% RSD and all SPCCs must have an average RF > 0.300, except bromoform, where RF > 0.250 is acceptable. The response factor generated from the five point calibration will be used for quantitation.

The concentration of the standards for the initial five-point calibration will range from 20 ng/mL - 200 ng/mL.

50 ng of p-BFB and a mid-range continuing calibration standard will be analyzed every 12 hours. The RFs from the calibration check must be ± 25% of the average RFs for the CCCs and meet the SPCC criteria already stated for the initial calibration. A five point calibration will be analyzed if the calibration check does not meet criteria.

Three surrogates will be added to each sample at a concentration of 50 ng/ml. If the recovery of the added surrogates does not meet QA requirements, the analysis is repeated. Poor recovery on the second analysis infers matrix interference. The surrogates and the acceptable recovery range are listed in Table 9.2.

	Recovery Range (%)	
Surrogate	water	soil
Dibromofluoromethane	86-115	80-120
Toluene-d8	88-110	81-117
4-Bromofluorobenzene	86-115	74-121

Table 9.2

9.2 GC/MS Semivolatile Organics

DFTPP Tune
A solution of 50 ng/uL of decafluorotriphenylphosphine (DFTPP) is evaluated for each 12-hour shift as per EPA Method 8270. The DFTPP solution must meet the following criteria for a 50 ng injection of DFTPP (Table 9.3).

DFTPP KEY IONS AND ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
51	30-60% of mass 198
68	<2% of mass 69
70	<2% of mass 69
127	40-60% of mass 198
197	<1% of mass 198
198	Base peak, 100% relative abundance
199	5-9% of mass 198
275	10-30% of mass 198
365	>1% of mass 198
441	Present but less than mass 443
442	>40% of mass 198
443	17-23% of mass 442

Table 9.3

Calibration

The initial calibration consists of separate five-point calibrations for the 8270 target compound list (TCL) and Tinuvin-328 that cover the range from 20 ng to 160 ng. The response factors for CCCs in the 8270 TCL calibration must be ≤ 30% RSD and the RF for the SPCCs must be > 0.050. The average RF for the 8270 TCL will be used for quantitation.

Every 12 hours, a 50 ng DFTPP standard, 8270 TCL calibration check, and Tinuvin-328 continuing calibration will be analyzed. The % difference of the RFs from the calibration check must be ≤ 30% of the average RF for the CCCs and meet the SPCC criteria already stated for the initial calibration. The five point 8270 TCL calibration will be analyzed if the calibration check does not meet criteria.

Six surrogates will be added to each sample at a concentration of 100 ng/ml for the base/neutrals and 200 ng/ml for the acid extractables. If the recovery of the added surrogates does not meet QA requirements for 2 out of 3 for each fraction, the extraction and analysis is repeated. Poor recovery on the second analysis infers matrix interference. The surrogates and the acceptable recovery range are listed in Table 9.4.

Surrogate	(ng/ml)	Recovery Range (%) Water	Soil/Sediment
2-Fluorophenol	200	21-100	25-121
Phenol-d6	200	10- 94	24-113
Nitrobenzene-d5	100	35-114	23-120
2-Fluorobiphenyl	100	43-116	30-115
2,4,6-Tribromophenol	200	10-123	19-122
Terphenyl-d14	100	33-141	18-137

Table 9.4

9.3 Metals

SW-846 methodology will be employed for daily working protocol. Where the SW-846 methods fall short or are vague as to procedures for nonconforming QC sample data, ETL utilizes CLP procedures for guidance in establishing daily standard operating procedures. Examples are as follows:

A. Serial dilutions and interference check solutions are evaluated as per CLP protocol.

B. Analytical spikes are employed in graphite furnace analysis following CLP guidelines using ETL laboratories' limits of 75-125% for evaluation of the analytical spike recovery data.

Initial Calibration: An Initial Calibration will be evaluated on a daily basis. The percent recovery of each analyte must agree within 10% of the true value. The initial calibration for mercury must agree with 20% of the true value.

Continuing Calibration: A Continuing Calibration is performed at a frequency of 10%. The percent recovery must agree within 10% of the true value. The continuing calibration for mercury must agree within 20% of the true value.

Interference Check Solution (ICP only) These Check Solutions are analyzed at the beginning and end of an analysis run or every eight hours. Values obtained must agree within ± 20% of the true (established) value.

Serial Dilution (ICP only) This dilution is analyzed at a frequency of one per matrix batch of 20 samples. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), an analysis of a 5-fold dilution must agree within 10% of the original determination.

9.4 Wet Chemistry

Analyses for wet chemistry parameters will be conducted using the EPA procedures listed in Table 8.1. Analyses will be performed in accordance with the methods stated herein unless specific project requirements or needs dictate adoption of an alternate method or modification of the cited method. If analysis is performed in an alternate manner, the method or modification used shall be documented in the project records with prior approval from Woodward-Clyde Consultants and the NSCA. A list of parameters, methods and reporting limits for water and soil are included in Table 9.3. The actual detection limit obtained is highly matrix dependent, therefore the expected detection limit may not always be achievable.

9.5 GLASSWARE CLEANING PROCEDURES

Laboratory glassware washing procedures are adapted from SW-846, Standard Methods for the Examination of Water and Wastewater, and EPA 600/4-79-019, and are as follows:

Volatile Organics Wash with hot water and Alconox or Liquinox, then rinse thoroughly with tap water and deionized water. Rinse glassware with methanol and allow to drain. Bake in an oven at 185°C for two hours.

Nutrients, Demands Wash with hot water and Liquinox, rinse thoroughly with tap and deionized water, and air dry. Store glassware inverted or cap openings with foil.

Metals ETL has adapted the laboratory glassware washing procedures from SW-846, and other EPA approved methodology including EPA 600/4-79-019.

Pipet Cleaning

1. Soak pipets in a 10% nitric acid solution in the designated plastic 2000 ml graduated cylinder. Pipets should be placed in the cylinder with tips up. Minimum soaking time is 20 minutes.
2. Pour off nitric acid solution and rinse the pipets in the graduated cylinder at least four times with Type I water.
3. Drain off the water and stand the pipets in the pipet drying rack.
4. Dry the pipets in an oven.

9.6 REAGENT STORAGE

Reagents are stored with consideration for safety and maximum shelf life.

All acids, except those poured up in small marked containers which are for immediate use, are in separate areas designated for specific acid storage and are stored in the original container. All bases, except those poured up in small containers for immediate use and those that are standardized for specific purposes, are stored in designated areas in the original containers.

Solvents are specified as either flammable or nonflammable. All solvents, except those poured for immediate use are stored in designated cabinets or areas. Dry reagents are stored in designated cabinets in cool, dry areas.

9.7 WASTE DISPOSAL

All waste disposal is carried out in accordance with ETL's Waste Disposal SOP. This document includes procedures for identification, storage, personnel training, tracking forms, report forms, safety, as well as details of the disposal. Hazardous waste disposal procedures are given in Table 9.5.

WASTE DISPOSAL PROCEDURES

Waste Type	Associated Analytical and Sample Prep Methods	Storage Procedures	Disposal Procedures
Methylene Chloride	Pesticides, Herbicides, BNA, GPC, etc.	Store in glass bottles, then in drums	Reclaimed by HW contractor
Freon	Oil & grease, Petroleum hydrocarbons	Store in glass bottles, then in drums	Reclaimed by HW contractor
Mixed Solvents (Flammable & nonhalogenated)	VOC standards, Herbicides, Pesticides	Store in glass bottles, then in drums	Disposal by HW contractor
Mixed Halogenated Solvents	VOC standards, Phenols	Store in glass bottles, then in drums	Disposal by HW contractor
All neat standards and mixes over 100 ppm	All analyses	Store in original bottles or glass/plastic bottles	Disposal by HW contractor
Heavy Metals Solutions	Metals, COD, Chloride	Store in glass bottles, then in drums	Disposal by HW contractor
Acid Solutions	Metals, General inorganics, Extractions	Store in glass bottles or add to neutralizing chambers	Neutralize; site pre-treatment plant
Alkaline Solutions	General inorganics, Extractions	Store in glass bottles	Neutralize; sanitary sewer
All samples containing organics or inorganics exceeding hazardous waste standards*	All analytical groups	Store in original bottles or jars	Disposal by HW contractor

TABLE 9.5

*Hazardous Waste Characteristics (D001-D017) (40 CFR Part 261), HCN > 250 mg/kg, HS > 500 mg/kg, FP < 140° F, pH ≤ 2 or ≥ 12.5, TCLP Toxicity Characteristics (Federal Register, 55FR 11798), March 29, 1990, or contains greater than 50 ppm PCBs

Estimated Quantitation Limits Inorganics

Parameter	Method	EQL mg/l	EQL mg/kg
Biochemical Oxygen Demand	405.1	2.0	NA
Total Suspended Solids	160.2	5.0	NA
Total Dissolved Solids	160.1	5.0	NA
Chemical Oxygen Demand	410.4	10	NA
Total Organic Carbon	415.1	0.50	NA
Total Kjeldahl Nitrogen	351.3	1.0	250
Ammonia Nitrogen	350.3	0.10	25
ortho-Phosphorus	365.2	0.020	1.0
Nitrate-Nitrite Nitrogen	353.1	0.050	NA
Calcium	200.7	0.010	1.0
Magnesium	200.7	0.025	2.5
Sodium	200.7	0.15	15
Potassium	258.1	0.10	10
Iron	200.7	0.010	1.0
Manganese	200.7	0.0050	1.0
Chloride	300.0	0.10	NA
Sulfate	300.0	0.10	NA
Alkalinity	310.1	1.0	NA
Total Petroleum Hydrocarbon	418.1	2.0	100
Oil and Grease	413.2	5.0	500

TABLE 9.6

Estimated Quantitation Limits Inorganics

Parameter	EQL ug/L	EQL ug/Kg	EPA Method
Antimony	11	1000	204.2
Arsenic	5.5	550	272.2
Barium	25	2500	200.7
Beryllium	9.0	900	200.7
Cadmium	1.0	100	213.2
Chromium	500	50000	200.7
Cobalt	75	7500	200.7
Copper	2.5	250	200.7
Iron	36	3600	200.7
Lead	2.3	230	239.2
Mercury	2.3	230	245.1
Nickel	260	26000	200.7
Selenium	3.6	360	270.2
Silver	6.0	600	272.2
Thallium	5.0	500	279.2
Vanadium	8.5	850	200.7
Zinc	11	1100	200.7
Cyanide	15	1500	335.3
Sulfide	5.0	500	376.2

TABLE 9.7

Estimated Quantitation Limits for 8260 Volatiles

Parameter	MDL ug/L	EQL ug/L	EQL ug/Kg
Chloromethane	0.27	10	50
Bromomethane	0.52	10	50
Vinyl chloride	0.24	10	50
Chloroethane	0.42	10	50
Methylene chloride	0.51	5.0	25
Bromochloromethane	0.52	5.0	25
Trichlorofluoromethane	0.27	5.0	25
1,1-Dichloroethene	0.25	5.0	25
1,1-Dichloroethane	0.22	5.0	25
cis-1,2-Dichloroethene	0.22	5.0	25
trans-1,2-Dichloroethene	0.18	5.0	25
Chloroform	0.32	5.0	25
1,2-Dichloroethane	0.40	5.0	25
1,1,1-Trichloroethane	0.16	5.0	25
Carbon Tetrachloride	0.14	5.0	25
Bromodichloromethane	0.46	5.0	25
1,2-Dichloropropane	0.41	5.0	25
1,3-Dichloropropane	0.69	5.0	25
2,2-Dichloropropane	0.32	5.0	25
1,1-Dichloropropene	0.15	5.0	25
trans-1,3-Dichloropropene	0.63	5.0	25
Trichloroethene	0.15	5.0	25
Benzene	0.25	5.0	25
Chlorodibromomethane	0.61	5.0	25
cis-1,3-Dichloropropene	0.61	5.0	25
1,1,2-Trichloroethane	0.34	5.0	25
Bromoform	0.68	5.0	25
1,1,2,2-Tetrachloroethane	1.28	5.0	25
1,2-Dibromo-3-chloropropane	1.28	5.0	25
Tetrachloroethene	0.24	5.0	25
Trichlorofluoromethane	0.44	5.0	25
Toluene	0.31	5.0	25
Chlorobenzene	0.42	5.0	25
Bromobenzene	0.63	5.0	25
Ethylbenzene	0.32	5.0	25
Styrene	0.50	5.0	25
n-Propylbenzene	0.27	5.0	25
Isopropylbenzene	0.27	5.0	25
p-Isopropyltoluene	0.46	5.0	25
n-Butylbenzene	0.39	5.0	25
sec-Butylbenzene	0.22	5.0	25
tert-Butylbenzene	0.40	5.0	25
o-Xylene	0.46	5.0	25
m/p-Xylene	0.32	5.0	25

Estimated Quantitation Limits for 8260 Volatiles
(Continued)

Parameter	MDL ug/L	EQL ug/L	EQL ug/Kg
2-Chlorotoluene	0.32	5.0	25
4-Chlorotoluene	0.31	5.0	25
1,2-Dichlorobenzene	0.62	5.0	25
1,3-Dichlorobenzene	0.67	5.0	25
1,4-Dichlorobenzene	0.71	5.0	25
Hexachlorobutadiene	0.47	5.0	25
1,2,4-Timethylbenzene	0.38	5.0	25
1,3,5-Trimethylbenzene	0.35	5.0	25
Dichlorodifluoromethane	0.54	5.0	25
1,2,3-Trichlorobenzene	0.95	5.0	25
1,2,4-Trichlorobenzene	0.77	5.0	25
Dibromomethane	0.61	5.0	25
1,2-Dibromoethane	0.70	5.0	25
1,1,1,2-Tetrachloroethane	0.54	5.0	25
1,2,3-Trichloropropane	0.79	5.0	25
Naphthalene	1.3	20	100

TABLE 9.8

Estimated Quantitation Limits for 8270 Semivolatiles

Parameter	MDL ug/L	EQL ug/L	EQL ug/Kg
Acenaphthene	2.3	10	330
Acenaphthylene	2.1	10	330
Anthracene	2.1	10	330
Benzo(a)anthracene	2.5	10	330
Benzo(b)fluoranthene	2.3	10	330
Benzo(k)fluoranthene	1.3	10	330
Benzo(a)pyrene	1.7	10	330
Benzo(g,h,i)perylene	2.2	10	330
Butylbenzyl phthalate	2.1	10	330
Bis(2-chloroethyl)ether	1.7	10	330
Bis(2-chloroethoxy)methane	1.7	10	330
Bis(2-chloroisopropyl)ether	1.6	10	330
Bis(2-ethylhexyl)phthalate	2.6	10	330
4-Bromophenyl phenyl ether	1.1	10	330
2-Chloronaphthalene	1.9	10	330
4-Chlorophenyl phenyl ether	1.3	10	330
Chrysene	3.1	10	330
Dibenz(a,h)anthracene	1.7	10	330
Di-n-butyl phthalate	4.2	10	330
1,3-Dichlorobenzene	1.3	10	330
1,4-Dichlorobenzene	1.4	10	330
1,2-Dichlorobenzene	1.7	10	330
3,3'-Dichlorobenzidine	9.1	20	660
Diethyl Phthalate	0.93	10	330
Dimethyl phthalate	0.83	10	330
2,4-Dinitrotoluene	0.88	10	330
2,6-Dinitrotoluene	0.63	10	330
Di-n-octyl phthalate	1.7	10	330
Fluoranthene	1.7	10	330
Fluorene	1.1	10	330
Hexachlorobenzene	1.2	10	330
Hexachlorobutadiene	1.4	10	330
Hexachloroethane	1.1	10	330
Indeno(1,2,3-cd)pyrene	1.5	10	330
Isophorone	1.6	10	330
Naphthalene	1.5	10	330
Nitrobenzene	2.1	10	330
N-Nitroso-di-n-propylamine	1.4	10	330
Phenanthrene	2.2	10	330
Pyrene	1.9	10	330
1,2,4-Trichlorobenzene	1.3	10	330
4-Chloro-3-methylphenol	2.3	20	660
2-Chlorophenol	3.9	10	330
2,4-Dichlorophenol	3.2	10	330

Estimated Quantitation Limits for 8270 Semivolatiles
(Continued)

Parameter	MDL ug/L	EQL ug/L	EQL ug/Kg
2,4-Dimethylphenol	0.41	10	330
2,4-Dinitrophenol	5.8	50	1650
4,6-Dinitro-2-methylphenol	3.3	50	1650
2-Nitrophenol	3.7	10	330
4-Nitrophenol	5.4	50	1650
Pentachlorophenol	3.1	50	1650
Phenol	3.4	10	330
2,4,6-Trichlorophenol	3.7	10	330
Tinuvin-328	1.1	10	330

TABLE 9.9

10. DATA REDUCTION, VALIDATION, AND REPORTING

10.1 Data Reduction and Validation

All analytical data generated by the ETL are checked at several levels for a variety of criteria. These criteria generally include but are not limited to conformance to method Standard Operating Procedure (SOP), meeting holding times, QC precision and accuracy criteria, blank criteria, significant figures and general sense of the reported values. The data validation process consists of data generation and reduction, as described below.

The analyst generating the analytical data has the prime responsibility for the correctness and completeness of the data. All data are generated and reduced following protocols specified in laboratory method SOPs. Each analyst reviews the quality of his or her work based on an established set of guidelines. The analyst reviews the data package to ensure that:

- The appropriate SOPs have been followed;
- Qualitative identification of sample components is correct;
- QC Sample acceptance criteria are met;
- Dilution factors are at a minimum, are listed, and are correct;
- The required reporting limits are used (MDL, PQL,etc.) and have been met;
- Analytical results are correct and complete;
- The data are ready for incorporation into the final report;

These data reduction and validation steps are performed and documented by the analyst. At this point, the analyst enters the data into the Laboratory Information Management System (LIMS). ETL LIMS resides on a VAX® 4200 computer which employs Beckman Lab Manager® software.

The results undergo a second level of review by the Program Coordinator, who is responsible for sample control, LIMS, and report generation. The data that were entered into the LIMS are printed directly from the LIMS onto the desired forms or down-loaded to print files which are used to generate the hard copy file. This transfer eliminates transcription errors and allows for electronic processing into the desired report form. The Program Coordinator reviews the data package to ensure that:

- All samples on the Chain of Custody appear in the Laboratory Chronicle;
- The chain of custody is complete and a copy is attached to the report;
- The date of sampling and date of sample receipt by the lab is listed and agrees with the chain of custody;
- Dates of sample extraction and analysis are listed and meet the hold times;
- The appropriate SOPs have been followed;
- Any non-conformance is reported and the reason for the non-conformance is listed;
- All sample and extraction holding times have been documented;
- Sample preparation information is correct and complete;
- Client/Reporting requirements are met;
- Any non-conformance is documented and explained;
- Special sample preparation and analytical requirements have been met;

The third level review is performed by the Quality Assurance Officer to provide an independent review of the data package. This review is also conducted according to an established set of guidelines and is structured to ensure that:

- Calibration data are scientifically sound, appropriate to the method, and completely documented;
- The appropriate SOPs have been followed;
- Sample preparation information is correct and complete;
- The results of QC samples are within established control limits;
- Special sample preparation and analytical requirements have been met;
- Documentation is complete (all anomalies in the preparation and analysis have been documented, holding times have been met, etc.)

The Laboratory Manager reviews and signs the report to ensure that the data meet the reporting criteria and overall objectives of the client before the report is released, serving as a fourth level of review.

Each step of this review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of the data is essential in ensuring that data of high quality are generated consistently.

10.2 Data Reporting

A variety of reporting formats are available. For this project, the hard copy report will be organized as follows:

Title Page, Methodology/Terms: Description of sample types, method references and definitions. Any problems encountered and general comments are provided in a narrative.

Laboratory Chronicle: Sample dates, extraction dates, analysis dates and sample IDs are given in this section.

Analytical Data: Results are reported by sample or by test. The ETL reporting limit for each analyte is also given.

QC Information: The results (Percent Recovery and Relative Percent Difference) of the spiked sample pairs analyzed with the project are listed, together with the control limits. Also, the analytical results for method blanks generated during analysis of organic and metals parameters are given.

Results of any duplicates, matrix spikes, matrix spike duplicates, surrogates, or other project-specific QC are also reported.

Chain of Custody: A copy of the chain of custody pertaining to the reported samples is included with the report.

Custom Services: Special services including data interpretation, special consultation, and raw data packages (when requested) are included.

A disk deliverable is required for this project. The same data listed above are provided in a project defined format on a 3.5 inch high density diskette. The required information is provided in two files in an ASCII delimited format without leading zeros and without leading or trailing spaces in any of the records.

11. INTERNAL QC CHECKS

The Environmental Testing Laboratory's (ETL) approach to quality assurance for analyses is primarily controlled by evaluation of blanks, duplicate analyses and spike or duplicate spike analyses. Criteria specified in Section 5 must be met or that batch of samples associated with a failing set of QC samples will have to be reanalyzed. These control samples are discussed below.

Method Blank Method blanks, also known as reagent, analytical, or preparation blanks, are analyzed to assess the level of background interference or contamination which exists in the analytical system and which might lead to the reporting of elevated concentration levels or false positive data. As standard ETL practice, a method blank is analyzed with every batch of samples processed. A method blank consists of reagents specific to the method which are carried through every aspect of the procedure, including preparation, clean-up, and analysis. The results of the method blank analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples. Ideally, the concentration of target analytes in the blank should be below the estimated quantitation limit (EQL) for that analyte. In practice, however, some common laboratory solvents and metals are difficult to eliminate to the parts-per-billion levels commonly reported in environmental analyses. Therefore, criteria for determining blank acceptability must be based on consideration of the analytical techniques used, analytes reported, and Reporting Limits required.

For metals analysis, where the reporting limits are typically near the estimated quantitation limit (EQL), and background levels for certain metals are difficult to completely eliminate, the policy is that the concentration of the target analytes in the blank must be below two times the EQL. If the blank value for a target analyte lies below the reporting limit, the reporting limit for that analyte in the associated samples is unaffected. A blank containing an analyte(s) above two times the EQL is considered unacceptable unless the lowest concentration of the analytes in the associated samples is at least ten times the blank concentration (as per regulatory agency protocol).

For conventional inorganic tests, the method SOP directs how the blank is treated. Generally, a reagent blank is used both to zero the equipment and as one of the calibration standards. If a preparation step is required for the analysis, then a preparation blank is also analyzed to determine the extent of contamination or background interference. In most cases, the concentration found in the preparation blank is subtracted from the concentration found in any associated sample prior to calculating the final result. Blanks have no application or significance for some conventional inorganic parameters (eg. pH).

If the blank does not meet acceptance criteria, the source of contamination must be investigated and appropriate corrective action must be taken and documented. Investigation includes an evaluation of the data to determine the extent and effect of the contamination on the sample results. Corrective actions may include reanalysis of the blank and/or repreparation and reanalysis of the blank and all associated samples.

For organic and metal analyses and selected conventional inorganic tests, method blank results are reported with each set of sample results. Sample results are not corrected for blank contamination, except when expressly requested by the client. Occasionally, due to limited sample volume or other constraints, the laboratory reports data associated with an unacceptable blank. If blank correction is requested, then it is so stated in the final report.

Trip Blanks The trip blank is to be used when sampling the volatile organics. The purpose is to determine if contamination has occurred as a result of improper sample container cleaning, contaminated blank source water, sample contamination during storage and transportation due to exposure to volatile organics (e.g., gasoline fumes) and other environmental conditions during the sampling event.

Trip blanks are prepared prior to the sampling event by the laboratory providing sample containers. Water trip blanks are used for samples of all matrices (water, soil, sediment, sludge, etc.). The water must be free of volatile organic contaminants. Any appropriate preservatives must be added at the time that blanks are prepared. The sample containers are sealed, labeled appropriately, and transported to the field in the same sampling kits as the sample vials. These blanks are not to be opened in the field. They are to be transferred to the sample cooler designated for volatile sample storage and accompany the samples to the laboratory.

One trip blank for each volatile organic analysis shall be provided per cooler used for storing and transporting volatile sample vials. If a laboratory requires submission of multiple vials for a method, the same number of vials must be submitted for each trip blank.

Matrix Duplicates, Matrix Spikes and Matrix Spike Duplicates

Matrix Duplicate A Matrix Duplicate (MD) is a sample derived from the division of an environmental sample into two separate aliquots. The aliquots are processed separately and the results compared to determine the effects of the matrix on the precision of the analysis. Results are expressed as Relative Percent Difference (RPD).

Matrix Spike A Matrix Spike (MS) is an environmental sample to which known concentrations of analytes have been added. The MS is taken through the entire

analytical procedure and the recovery of the analytes is calculated. Results are expressed as percent recovery. The MS is used to evaluate the effect of the sample matrix on the accuracy of the analysis.

Matrix Spike Duplicate A Matrix Spike Duplicate (MSD) is a sample is derived from the division of an environmental sample into two separate aliquots. Each aliquot is spiked with known concentrations of analytes. The two spiked aliquots are processed separately and the results compared to determine the effects of the matrix on the precision and accuracy of the analysis. Results are expressed as relative percent difference (RPD) and percent recovery. In accordance with the above criteria, ten percent of all samples are spiked in duplicate with the parameter being analyzed. The most recent twenty (20) results of these spiked samples are used to generate control charts for both percent recovery (%R) and relative percent difference (RPD) between analyses of duplicate samples. If either of these criteria do not meet the control chart limits, the analysis of all samples in those analytical batches are repeated.

12. PERFORMANCE AND SYSTEMS AUDITS

Internal Systems Audits

On an annual basis, an on-site systems audit is conducted by Ciba's Toxicology, Regulatory, and Compliance (TRAC) on all aspects of the laboratory and field operations at each facility. This audit is coordinated by the manager and is conducted by a multiperson audit team. This on-site audit may be supplemented by review of reports and QA data in the LIMS network and review of selected data packages. An audit report is issued by the team, to the president within two months of completion of the audit and a copy is provided by the QA manager to the lab director.

The annual system audits consist of an examination of laboratory procedures and documentation to ensure that the entire laboratory is being operated according to established protocol. The auditors will ensure that the proper frequency of quality control standards, spikes, duplicates, etc., are incorporated with each sample analytical run, and all results are documented, up to date, and accessible for review. Control charts are checked to ensure their proper maintenance. Calculations are spot checked and data procedures are reviewed to ensure SOPs are being followed, and special attention is given to calibration procedures. The systems audit check also ascertains whether proper documentation exists to trace working analytical standards back to stock standards. Finally, analysts' techniques are evaluated against techniques as defined in the SOPs, the Employment/Training SOP, and recognized good laboratory practices.

The QA manager and lab director respond to the audit and are responsible for follow up on required corrective action.

External Performance Audit

As a certified laboratory, ETL participates in USEPA Water Supply (WS) and Water Pollution (WP) semi-annual rounds of performance evaluation sample studies, as well as an annual audit of National Pollution Discharge Elimination System (NPDES) permit holders. The laboratory has an outstanding record of performance on these studies for the past five years. These results are also available for inspection.

Results from these performance audits will be submitted to Ciba-Geigy NSCA.

The Ciba-Geigy Corporate Environmental Testing Laboratory (ETL) is currently certified in New Jersey, North Carolina, South Carolina, Pennsylvania, Delaware, Connecticut, Alabama, Massachusetts and Iowa. In view of the rigor of the resident state's certification program (New Jersey), most other states offer certification through reciprocity. As such, the ETL is subject to external, unannounced site visits by regulatory, certifying agencies, primarily the New Jersey Department of Environmental Protection and Energy (NJDEPE). ETL underwent such an audit in May of 1993, incurring no deficiencies, only recommendations. Official results of this audit are available for inspection.

13. PREVENTIVE MAINTENANCE

Preventive maintenance is routinely performed on each analytical instrument to minimize downtime and interruption of analytical work. Designated laboratory personnel are trained in routine maintenance procedures for all major instrumentation. Annual maintenance agreements are purchased for every major analytical system, including laboratory data acquisition systems. ETL maintains service agreements on major instrumentation which cover all non-consumable parts and labor. Minor repairs not covered under the service agreement are performed by either trained ETL staff or service technicians employed by the instrument manufacturer.

For this project, redundancy in analytical capability exists for total organic carbon, chemical oxygen demand and biochemical oxygen demand analyses. For the remaining wet chemistry analyses, alternate methods exist in the unlikely event that they should be required. Flame atomic absorption capability exists as an alternative to ICP analysis of water quality metal parameters, although this is an unlikely requirement in view of metals holding times and response time of service agreements. Any alternate methods would have the approval of the National Service Contract Administrator prior to their implementation.

ETL maintains detailed logbooks documenting the preventive maintenance and repairs performed on each analytical instrument.

FIGURE 13-1

LABORATORY EQUIPMENT PREVENTIVE MAINTENANCE SCHEDULE

EQUIPMENT ITEM	D	W	M	Q	A	SERVICE LEVEL
FISONS 3580B ICP						
Profile	X					Profile on a daily basis.
Nebulizer	X					Inspect and clean. Replace tubing daily. Check flow rate.
Filters		X				Inspect and clean.
Spray Chamber			X			Inspect and clean.
Quartz Torch			X			Clean and realign.
Mirrors				X		Inspect mirror surface and replace if necessary

FIGURE 13-1
(Continued)
LABORATORY EQUIPMENT PREVENTIVE MAINTENANCE SCHEDULE

EQUIPMENT ITEM	D	W	M	Q	A	SERVICE LEVEL
PERKIN ELMER 3100 FLAME AA						
Quartz Windows	X					Remove and clean with lint-free cloth and DI water.
Filters		X				Remove filter from instrument, clean with water and mild soap.
D2 Arc Lamp				X		Check lamp. Adjust or replace as necessary.
CONDUCTANCE METER YSI 35				X		Inspect and replatinize cell as necessary
FISHER AND ORION pH METERS	X					Inspect jprobe membrane, filling solution level.
ISO TEMP 500 OVEN	X					Verify correct temperature with calibrated thermometer.
AE200/AE160 METTLER ANALYTICAL BALANCES		X				Check calibration with Class S standard metric weights. Annual inspection.
TOP LOADER METTLER PE 1600	X					Check calibration with Class S standard metric weights. Annual inspection.
TECHNICON						
Pump Platen		X				Inspect weekly and replace as required.
Pump Tubes	X					Inspect and replace as needed.
Flow Cell		X				Inspect and clean.
BLOCK DIGESTOR				X		Check calibration against thermometer.
PE SPECTROPHOTOMETER				X		Quarterly check for wavelength verification.

FIGURE 13-1
(Continued)
LABORATORY EQUIPMENT PREVENTIVE MAINTENANCE SCHEDULE

EQUIPMENT ITEM	D	W	M	Q	A	SERVICE LEVEL
BOD INCUBATOR PRECISION LOW TEMPERATURE	X					Temperature checked twice daily.
HP 5890 GAS CHROMATOGRAPH - SEMIVOLATILES						
Autosampler System	X					Check daily for correct operation. Syringe and tubing solvent cleaned daily. Needles and tubing replaced as needed.
Septa	X					Replace autosampler septa daily and injector as needed.
GC Columns (Packed)		X				Change glass wool plugs at front of column.
GC Capillary Columns	X					Inspect daily. Change glass sleeve insert as needed and cut front of column if necessary.
EC Detector					X	Semiannually cleaned and leak tested by Varian.
FID Detector					X	In-house cleaning as needed.
Carrier Gases		X				Tanks are changed when pressure reads 500 to ensure purity.
Oxygen Trap				X		Inspect and replace as necessary.
HP 5890 GAS CHROMATOGRAPH VOC						
Column	X					Checked daily. Repack glass wool and replace column as needed.
Septum	X					Checked daily. Replace as necessary.
Gas Tank	X					Levels checked daily. Replace when pressure <500 psi.
Oxygen/Moisture Trap				X		Inspect and replace as necessary.
Particulate Trap					X	Checked and replaced if problem in GC flow rate.
Hall Detector	X					Checked daily for proper operation and response.
FID Detector	X					Checked daily for proper operation and response.
PID Detector	X					Checked daily for proper operation and response.

FIGURE 13-1
(Continued)
LABORATORY EQUIPMENT PREVENTIVE MAINTENANCE SCHEDULE

EQUIPMENT ITEM	D	W	M	Q	A	SERVICE LEVEL
GC/MS HEWLETT PACKARD 5970/5890						
Column	X					Front portion of column checked/maintained daily for contamination; replace every one month or as needed.
Septum	X					Changed daily.
Injection Port Liner	X					Changed daily.
Splitless Disc	X					Changed daily.
Autosampler	X					Checked daily for proper function.
Rough Pump				X		Oil changed to ensure proper operation.
Turbo Pump				X		Turbo molecular pump oiled as needed by instrument service representative.
Mass Spectrometer				X		Cleaning of source every one month or as needed.
Tape Head					X	Cleaned after each tape.
Tape Drive					X	Cleaned annually.
PURGE AND TRAP TEKMAR 2000/2016/LSC2						
Sorbent Trap	X					Checked daily. Replace and condition as necessary.
Purge Flow	X					Checked daily, adjust as needed.
Gas Tank	X					Check daily.

14. SPECIFIC SOPs USED TO ASSESS DATA PRECISION, ACCURACY, REPRESENTATIVENESS AND COMPLETENESS

Data Quality Assessment

The effectiveness of a QA program is measured by the quality of data generated by the laboratory. Data quality is judged in terms of its precision, accuracy, representativeness, completeness and comparability. These terms are described as follows:

All data generated in this investigation will be assessed for its representativeness, accuracy, and precision. The completeness of the data will be determined by comparing the acquired data to the stated project objectives. Calculations are provided in this QAPjP in Section 5.

Estimated Quantitation Limits

Assuring the validity of quantitative measurements at low concentrations is an extremely difficult technical problem. With regulatory action levels being pushed lower and lower, the validity of any given measurement becomes even more important. The consequences of false positive or false negative data can be significant.

ETL takes very seriously its responsibility to report technically defensible data. Therefore, we have established an estimated quantitation limit (EQL) for each analyte in each method. The EQL represents the value above which we believe reliable data can be routinely obtained.

These estimated quantitation limits are derived from method detection limit (MDL) data. The MDL data were collected using the procedures described in 40 CFR 136, Appendix B.

15. CORRECTIVE ACTION FOR OUT-OF-CONTROL SITUATIONS

When errors, deficiencies, or out-of-normal situations exist, ETL's QA program provides systematic procedures, called "corrective actions" to resolve problems and restore proper functioning to the analytical system.

Laboratory personnel become aware that corrective actions may be necessary if:

- QC data are outside the acceptance limits for precision and accuracy;
- Blanks or spikes contain contaminants outside of acceptable limits;
- Undesirable trends are detected in spike recoveries or RPD between duplicates;
- There are unusual changes in detection limits;
- Deficiencies are detected by the QAO during internal or external audits or from the results of performance evaluation samples; or
- Inquiries concerning data quality are received from clients.

Corrective action procedures are often handled at the bench level by the analyst, who reviews the preparation or extraction procedure for possible errors, checks the instrument calibration, spike and calibration mixes, and instrument sensitivity. If the problem persists or the cause cannot be identified, the matter is documented in an error cause removal form (ECR) and forwarded to the laboratory supervisor, laboratory manager and the QAO. Steps taken to eliminate the problem are documented on the same form and a copy is returned to the initiator. The NSCA will be notified in writing of any corrective activities related to the Cranston data.

16. QA REPORTING PROCEDURES

The distribution of Quality Assurance Officer (QAO) audit findings is a valuable tool in maintaining maximum validity of reported values and for measuring the overall effectiveness of the QA program. It serves as an instrument for evaluating the program design, identifying problems and trends and planning for future needs. The QAO submits monthly reports to the Director, Corporate Environmental Technology. These reports include:

- The results of internal systems audits, including any corrective actions taken;
- Performance evaluation scores and commentaries;
- Results of site visits and audits by regulatory agencies and clients;
- Performance for major clients, based upon their feedback through questionnaires distributed for service critique;
- Comments and recommendations; and
- A summary of the QA data audits conducted.

The QAO submits monthly reports to the Director on the status of the QA Program. These reports summarize the information gathered through the laboratory reporting system and contain a thorough review and evaluation of ETL operations.

A copy of the systems audit(s) specific to Cranston defined in Section 12 will be submitted to the QAO and NSCA. QAPjP revisions will be circulated based upon distribution list in Section 2.

It is the responsibility of ETL to be in compliance with this Quality Assurance Project Plan. The NSCA will be promptly notified of any excursions or changes in personnel.

LABORATORY DOCUMENTATION

Complete and accurate documentation of analytical and procedural information is an important part of the QA program. The following describes different types of documentation used at ETL.

SOPs

Detail of analytical and QC protocols are contained in SOPs. SOPs are documents that contain detailed information on the requirements for the correct performance of a laboratory procedure. The format for these SOPs is given in CIBA-GEIGY SOP No. 1005.0, Standard Operating Procedures for the Environmental Technology Department of Ciba-Geigy Corporation, available for inspection.

All SOPs are approved by the QAO. The distribution of current SOPs and archiving of outdated ones is controlled through the QAO.

LIMS

ETL uses a customized, commercial Laboratory Information Management System (LIMS) as the primary database for final results. The LIMS software is Beckman LabManager®; the computer is a VAX®4100. Other data are archived on magnetic tape or disk.

Laboratory Notebooks

Laboratory notebooks are used to document information that cannot easily be recorded in the LIMS or archived on magnetic tape or disk (e.g., method/data not covered by SOPs or worksheets). Information typically recorded in laboratory notebooks includes unusual observations or occurrences in the analysis of samples, or methods development information. Each page in a laboratory notebook is initialed and dated as information is entered, if assigned to more than one analyst. Notebooks used by ETL personnel contain pre-numbered pages and all entries are made in ink. Raw data printouts for some analyses may be taped directly into the notebooks. Filled notebooks are archived in the ETL files in a secure area.

17. CURRENT PERSONNEL FOR KEY POSITIONS

Key personnel directly responsible for overall sampling and analytical project coordination include:

Denis Mitchell
Laboratory Manager
Voice: (908) 914-2519
FAX: (908) 914-2916

Julie Smith
Program Coordinator
Voice: (908) 914-2845
FAX: (908) 914-2905

Edward Hewitt
Sample Coordinator
Voice: (908) 914-2775
FAX: (908) 914-2916

Key personnel directly responsible for analyses of the samples include:

Dan Britton
Wet Chemistry Laboratory Supervisor
Voice: (908) 914-2936
FAX: (908) 914-2916

Dorren McNichols
Metals Laboratory Supervisor
Voice: (908) 914-2928
FAX: (908) 914-2916

Dave Ellis
Organics Laborarory Supervisor
Voice: (908) 914-2710
FAX: (908) 914-2916

All of the above personnel are located at:

CIBA-GEIGY Corporation
PO Box 71
Route 37 West
Toms River, NJ 08754

The following pages are qualification summaries of key personnel involved in the Cranston project.

Denis Mitchell
CIBA-GEIGY Corporation
P. O. Box 71
Toms River, NJ 08754

EDUCATION:

B.S. Chemistry, Mt. St. Marys College
Emmitsburg, MD 1958

WORK EXPERIENCE:

1993 to Present: Laboratory Manager, ETL
1987 to 1993: Laboratory Supervisor, ETL
1965 to 1987: Laboratory Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey
1963 to 1965: Laboratory Supervisor, Tenneco Chemical Corporation
1959 to 1963: Laboratory Supervisor, International Flavors and Fragrances

PROFESSIONAL ASSOCIATIONS:

American Chemical Society

Julie A. Smith
CIBA-GEIGY Corporation
P. O. Box 71
Toms River, NJ 08754

EDUCATION:

B.S. Biochemistry, Georgian Court College, Lakewood, NJ 1985

WORK EXPERIENCE:

1993 to Present: Program Coordinator, CIBA-GEIGY Corporation, Toms River, New Jersey

1989 to 1993: Laboratory Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey

1986 to 1989: Group Leader, Intech Biolabs, East Brunswick, New Jersey

Dan Britton
CIBA-GEIGY Corporation
P. O. Box 71
Toms River, NJ 08754

EDUCATION:

B.S, M.S, Chemistry, Rutgers University
New Brunswick, NJ 1972

WORK EXPERIENCE:

1973 to Present: Laboratory Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey
1969 to 1973: Medical Laboratory Technician, USAF
1968 to 1969: Laboratory Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey

PROFESSIONAL ASSOCIATIONS:

American Chemical Society

DORREN K. McNICHOLS
CIBA-GEIGY Corporation
P. O. Box 71
Toms River, New Jersey 08754

EDUCATION:

B.S. Chemistry, College of Mount Saint Vincent 1972

WORK EXPERIENCE:

1978 to Present: Laboratory Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey
1973 to 1977: Laboratory Technician, SEL-REX, Incorporated, Nutley, New Jersey

COURSES:

Attended Ocean County College for Computer Science. Completed training in Machine Management and Organization, BASIC, COBOL and Advanced COBOL Computer Languages.

Dave Ellis
CIBA-GEIGY Corporation
P. O. Box 71
Toms River, NJ 08754

EDUCATION:

B.S., Ph. D., Chemistry, University of Manchester, U.K., 1968

WORK EXPERIENCE:

1969 to Present: Supervisor, CIBA-GEIGY Corporation, Toms River, New Jersey

18.0 LIST OF CHANGES TO THE QAPjP

This section is intended to summarize the changes that are incorporated over time. It will also document the project requirements over time.

Date	Revision	Section Affected
12/10/92	1[1]	1,2,3,4,8,10,12,16,17,18
2/01/94	2[2]	2,3,4,5,6,7,8,9,10,11,12,13,16,17,18

[1]For details, see tracking form #6, Cranston QAPP, Supplement #1
[2]For details, see tracking form #15, Cranston QAPP, Supplement #1

CRANSTON QAPjP TRACKING FORM

PERSON REQUESTING REVISION: Diana Baldi and John Rissel **Date request initiated:** 2/01/94

RESPONSIBILITY OF REQUESTOR IN CRANSTON PROJECT: D. Baldi: CIBA National Service Contract Administrator
J. Rissel: CIBA Corporate Analytical Technology Manager

NATURE OF CHANGE TO QAPjP:

Type: 1. Major X Minor ____ (check one)
2. Informational ____ Technical X (check one)

Section(s): Appendix G-Sections 2,3,4,5,6,7,8,9,10,11,12,13,16,17,18 of Document CIBA-GEIGY Environmental Testing Laboratory QAPP

REVISION: See attachment for detail of changes

REASON FOR CHANGE: See attachment for reasons for changes

EFFECTS OF CHANGE: The changes are minor and have little or no impact on the project. Changes to Section 9 address ETL's capability to bid on Appendix IX analyses.

NECESSARY CORRECTIVE ACTION(S): Project-wide distribution of the following sections of Appendix G to CIBA GEIGY QA Documents: Supplement #1: Sections 2,4,8,9,11,12,17,18. These sections will be accompanied by Cranston QAPP Tracking Form No. 15 for project-wide distribution for inclusion in Section 18 of the Cranston QA Documents: Supplement #1.

W. Mitchell 2/16/94
Project Manager Date

Responsibility: CIBA Corporate Analytical Technology Manager

John Rissel for Diana Baldi 2/16/94
CIBA-GEIGY Project Coordinator Date

APPROVED (if technical change)

_____ _____
USEPA Project Manager Date

CHANGES TO CRANSTON QUALITY ASSURANCE
DOCUMENTS: SUPPLEMENT #1

1. Section 2, p 1: Revision numbers have been changed for pertinent sections of the document.

   REASON FOR CHANGE: Revisions to the document were required

   EFFECT OF CHANGE: None

2. Section 2, p 2: Kim Smith (Program Coordinator) has been changed to Julie Smith and Dave Ellis has been added as a Laboratory Supervisor. All phone numbers for the Toms River site have been changed.

   REASON FOR CHANGES: J. Smith has replaced K. Smith as Program Coordinator, D. Ellis has been added as Laboratory Supervisor of the Organics Laboratory. A new telephone system at the Toms River site required up-dating all phone numbers.

   EFFECT OF CHANGE: None

3. Section 4, p 4: The Organics Laboratory Supervisor has been added to the Organization Chart (Figure 4.3).

   REASON FOR CHANGE: ETL's capability has been expanded to include Organic Analyses as defined in Section 9. This work would involve the Organics Laboratory.

   EFFECT OF CHANGE: None

4. Section 4, p 5: The telephone numbers for reaching personnel at the Toms River site have been up-dated.

   REASON FOR CHANGE: New telephone system installed

   EFFECT OF CHANGE: None

5. Section 8, p 2: Correction of a typographical error in Table 8-2 for the parameter NO_3/NO_2.

   REASON FOR CHANGE: Correct error.

   EFFECT OF CHANGE: None

6. Section 9, pp 2-12: Define the expanded eligibility of ETL to bid on analyses requiring organic analyses capability.

   REASON FOR CHANGE: ETL's desire to market the increased capability as defined in this section.

   EFFECT OF CHANGE: None

7. Section 17, pp 1: Replace K. Smith (Program Coordinator) with J. Smith, add D. Ellis as Laboratory Supervisor and change telephone numbers.

REASONS FOR CHANGES: Reflect present status of ETL personnel and new telephone system.

EFFECT OF CHANGE: None

8. Section 17, pp 2-4: Add qualification summaries for J. Smith and D. Ellis.

REASON FOR CHANGE: Additional key personnel added

EFFECT OF CHANGE: None

9. Section 2. Page has been changed to show the current revision number and page 2 has been changed to show the specific laboratory for each supervisor.

REASON FOR CHANGE: The document is updated.

EFFECT OF CHANGE: None.

10. Section 3 has been changed to correct a typographical error.

REASON FOR CHANGE: The error is corrected.

EFFECT OF CHANGE None.

11. Section 4 has been changed to specify the actual responsibilities of the key personnel.

REASON FOR CHANGE: List the activities as they are presently being performed in ETL.

EFFECT OF CHANGE: Clarification of line of responsibility within ETL.

12. Section 5 has been changed to include the formulas used to calculate precision and accuracy for spiked samples, QC limits for RPD and % recovery for both water and soil samples for volatile and semivolatile analyses

REASON FOR CHANGE: Document the QC limits for the specified analysis of the submitted expanded capabikity of ETL.

EFFECT OF CHANGE: Allow for the evaluation of the ability of ETL to perform required analyses.

13. Section 6, page 2 has been corrected to biochemical oxygen demand instead of biological oxygen demand.

REASON FOR CHANGR: Correct the definition.

EFFECT OF CHANGE: None.

14. Sections 8, 9, and 10 have been expanded to include the methods and instruments used for organic analyses. Also included is the concentration of the calibration standards and the frequency of standardization.

REASON FOR CHANGE: This data is required before a laboratory can be approved for organic analysis.

EFFECT OF CHANGE: Completes part of the requirements